

Appl. No. 10/689,177
Reply to Office Action of February 9, 2006

REMARKS

Reconsideration of the above-referenced application in view of the following remarks is respectfully requested.

Claims 1-20 are pending in this case.

The Examiner rejected claims 1, 3 and 5-7 under 35 U.S.C. 102(e) as being anticipated by Tseng (U.S. Patent 6,093,621).

Applicant respectfully submits that claim 1 is unanticipated by Tseng as there is no disclosure or suggestion in the reference of after removing the exposed portion of the hardmask layer, creating a trench through the trench guide opening with a plasma. The Examiner incorrectly asserts that Tseng teaches removing an exposed portion and after removing the exposed portion, creating a trench. While Tseng teaches pulling back the edges of mask 106 and removing the exposed portions of dielectric layer 104, Tseng does not teach creating a trench through the trench guide opening with a plasma after removing the exposed portion of layer 104. As shown in FIG. 1C portions of dielectric layer 104 are exposed but not yet removed and in FIG. 1D the exposed portions have been removed and the trench deepened. It is not clear from the drawings which occurs first. However, the text at Col 3, lines 5-17, clearly states that the trench 108 is further etched while the exposed portion of layer 104 is removed as opposed to after as required by the claim.

Taking each limitation of the claim in turn, "forming an opening in a substrate through a patterned photoresist layer and a hardmask layer located over said substrate with a plasma"-- Tseng shows in FIG. 1a forming a opening through resist layer 106 and dielectric layer 104. "trimming said photoresist layer with a plasma to create an exposed portion of said hardmask layer" --Tseng shows in Fig. 1C trimming the resist

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layer 106 to form layer 106a which exposed a portion of layer 104. "removing said exposed portion with a plasma to create a trench guide opening" –Tseng shows the exposed portion removed in FIG. 1D. "after removing said exposed portion, creating a trench through said trench guide opening with a plasma" – while the trench 108a is extended during the step of removing the exposed portion of layer 104 as shown in FIG. 1D, there is no disclosure of creating or even extending the trench after removing the exposed portion of layer 104. Accordingly, Applicant respectfully submits that claim 1 and the claims dependent thereon are unanticipated by Tseng.

The Examiner rejected claims 2, 4 and 8-9 under 35 U.S.C. § 103(a) as being unpatentable over Tseng (U.S. Patent 6,093,621) in view of Miller (U.S. Patent 6,218,309).

Applicant respectfully submits that claims 2, 4, 8, and 9 are patentable over Tseng in view of Miller as there is no disclosure or suggestion in the references of after removing the exposed portion of the hardmask layer, creating a trench through the trench guide opening with a plasma, as required by claim 1 from which these claims depend. As discussed above, Tseng fails to disclose or suggest this feature. Miller is applied to teach the use of a BARC, employing the same plasma tool, and specific flow rates, source power and bias power. The combination of Tseng and Miller fails to teach or suggest after removing the exposed portion of the hardmask layer, creating a trench through the trench guide opening with a plasma. Accordingly, Applicant respectfully submits that claims 2, 4, 8, and 9 are patentable over the references.

The Examiner rejected claims 10-11, 13, 15-17 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Tseng (U.S. Patent 6,093,621) in view of Kadosh et al. (U.S. Patent 5,770,483).

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Applicant respectfully submits that claims 10 and 20 are patentable over the references for the same reasons discussed above relative to claim 1, from which claims 10 and 20 depend.

Applicant respectfully submits that claim 11 is patentable over the references as there is no disclosure or suggestion in the references of after removing the exposed portion of a hardmask, creating a trench through a trench guide opening with a plasma, as required by the claim. While Tseng teaches pulling back the edges of mask 106 and removing the exposed portions of dielectric layer 104, Tseng does not teach creating a trench through the trench guide opening with a plasma after removing the exposed portion of layer 104. As shown in FIGs. 1C and 1D and discussed in the text at Col 3, lines 5-17, the trench 108 is further etched while the exposed portion of layer 104 is removed. There is no disclosure or suggestion that the trench is created or etched after the exposed portion of a hardmask is removed. Kadosh is added to teach forming trench isolation between active areas and forming transistors in the active areas and interconnects over the transistors. The combined references fail to disclose or suggest after removing the exposed portion of a hardmask, creating a trench through a trench guide opening with a plasma, as required by the claim. Accordingly, Applicant respectfully submits that claim 11 and the claims dependent thereon are patentable over the references.

The Examiner rejected claims 12, 14, 18-19 under 35 U.S.C. § 103(a) as being unpatentable over Tseng (U.S. Patent 6,093,621) and Kadosh et al. (U.S. Patent 5,770,483) as applied to claims 11, 13-17 above, and further in view of Miller (U.S. 6,218,309).

Applicant respectfully submits that claims 12, 14, 18, and 19 are patentable over the references for the same reasons discussed above relative to claim 11 from which these claims depend. Miller is applied to teach the use of a BARC, employing the same plasma tool, and specific flow rates, source power and bias power. The combination of the references fails to teach or suggest after removing the exposed portion of the

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hardmask layer, creating a trench through the trench guide opening with a plasma. Accordingly, Applicant respectfully submits that claims 12, 14, 18, and 19 are patentable over the references.

In light of the above, Applicant respectfully requests withdrawal of the Examiner's rejections and allowance of claims 1-20. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

Respectfully submitted,



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